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Ferromagnetic resonance with long Josephson junction

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Abstract

© 2017 IOP Publishing Ltd. In this work we propose a hybrid device based on a long Josephson junction (JJ) coupled inductively to an external ferromagnetic (FM) layer. The long JJ in a zero-field operation mode induces a localized AC magnetic field in the FM layer and enables a synchronized magnetostatic standing wave. The magnetostatic wave induces additional dissipation for soliton propagation in the junction and also enables a phase locking (resonant soliton synchronization) at a frequency of natural ferromagnetic resonance. The later manifests itself as an additional constant voltage step on the current-voltage characteristics at the corresponding voltage. The proposed device allows to study magnetization dynamics of individual micro-scaled FM samples using just DC technique, and also it provides additional phase locking frequency in the junction, determined exclusively by characteristics of the ferromagnet.

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Keywords

ferromagnetic resonance, Josephson soliton synchronization, long Josephson junction

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